



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,639	12/04/2003	Yutaka Nakamura	101136-00104	6176

7590 10/01/2004

ARENT FOX KINTNER PLOTKIN & KAHN, PLLC  
Suite 400  
1050 Connecticut Avenue, N.W.  
Washington, DC 20036-5339

EXAMINER

COURSON, TANIA C

ART UNIT PAPER NUMBER

2859

DATE MAILED: 10/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/726,639

Applicant(s)

NAKAMURA ET AL.

Examiner

Tania C. Courson

Art Unit

2859

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 2 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 2 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 20JUL04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-2 are rejected under 35 U.S.C. 102(e) as being unpatentable over Shirai et al. (US 6,622,391 B1).

Shirai et al. disclose a rotary encoder including the following:

- a) a fixed section (Fig. 2), a rotating section which can be rotated with reference to the fixed section (Fig. 2, magnetic drum 43), angle detecting means for detecting a rotation angle of the rotating section with reference to a predetermined reference position of the rotating section (Fig. 2, rotary encoder 41), and output means for outputting the detected angle, wherein, when the angle detecting means detects an angle  $\theta_n = n \times \theta_s$  ( $n = 1, 2, \dots, N$  (where  $N \times \theta_s = 360^\circ$ )) which is an integer multiple of a predetermined angle  $\theta_s$  ( $\theta_s \geq$  output resolution) such that the rotating section is rotated, an angle error  $E(\theta_n)$  included in the detected angle  $\theta_n$  is measured, functions between the detected angle  $\theta_n$  and errors  $E(\theta_n)$  are defined by the equation stated in claim 1 (column 10, line 42 through column 11, line 51), an amplitude  $A_i$  and an

initial phase  $\phi_i$  ( $i=1,2,\dots N/2$  or  $(N-1)/2$ ) are calculated such that all the defined equations are satisfied (column 10, line 42 through column 11, line 51), storing means for storing an error function which is given by equation stated in claim 1, and which is a periodic function of a detected angle  $\theta_a$  having the calculated amplitude  $A_i$  and the calculated initial phase  $\phi_i$  as coefficients is arranged, the detected angle  $\theta_a$  detected by the angle detection means is substituted for the variables in the equation of the error function  $E(\theta)$  stored by the storing means, and a value obtained by subtracting the value  $E(\theta_a)$  obtained by the substitution from the detected angle  $\theta_a$  is outputted by the output means (column 10, line 42 through column 11, line 51).

- b) a fixed section (Fig. 2), a rotating section which can be rotated with reference to the fixed section (Fig. 2, magnetic drum 43), angle detecting means for detecting a rotation angle of the rotating section with reference to a predetermined reference position of the rotating section (Fig. 2, rotary encoder 41), and output means for outputting the detected angle, wherein, when the angle detecting means detects an angle  $\theta_n = n \times \theta_s$  ( $n = 1, 2, \dots, N$  (where  $N \times \theta_s = 360^\circ$ )) which is an integer multiple of a predetermined angle  $\theta_s$  ( $\theta_s \geq$  output resolution) such that the rotating section is rotated, an angle error  $E(\theta_n)$  included in the detected angle  $\theta_n$  is measured, combinations between the detected angle  $\theta_n$  and errors  $E(\theta_n)$  are defined by the equation stated in claim 2 (column 10, line 42 through column 11, line 51), an amplitude  $A_i$  and an initial phase  $\phi_i$  ( $i=1,2,\dots N/2$  or  $(N-1)/2$ ) are calculated such that all the

defined equations are satisfied (column 10, line 42 through column 11, line 51), storing means for storing an error function which is given by the equation stated in claim 2, and which is a periodic function of a detected angle  $\theta_a$  having at least one amplitude  $A_{k1}, A_{k2}, \dots, A_{km}$  and at least one initial phase  $\phi_{k1}, \phi_{k2}, \dots, \phi_{km}$  ( $k1, k2, \dots, km$  is at least one of natural numbers from 1 to  $N/2$  or  $(N-1/2)$  of the calculated amplitudes  $A_i$  and the calculated initial phase  $\phi_i$  as coefficients is arranged, the detected angle  $\theta_a$  detected by the angle detection means is substituted for the variables in the equation of the error function  $E(\theta)$  stored by the storing means, and a value obtained by subtracting the value  $E(\theta_a)$  obtained by the substitution from the detected angle  $\theta_a$  is outputted by the output means (column 10, line 42 through column 11, line 51).

### ***Conclusion***

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The prior art cited on PTO-892 and not mentioned above disclose a rotary encoder:

Kudo (US 6,774,355 B2)

Uchida et al. (US 5,435,067)

Nishimura et al. (US 5,101,102)

Art Unit: 2859

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tania C. Courson whose telephone number is (571) 272-2239.

The examiner can normally be reached on Monday-Friday from 8:00AM to 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez, can be reached on (571) 272-2245.

The fax number for this Organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



DIEGO F.F. GUTIERREZ  
SUPERVISORY PATENT EXAMINER  
GROUP ART UNIT 2859

TCC  
September 28, 2004